OKLAHOMA EPHEMERAL GULLY EROSION PREDICTION TABLES

The ephemeral erosion charts have been updated to reflect RUSLE technology. RUSLE values for R, rainfall erosion index, K, adjusted soil erodibility factor, and CP, cover management factor and support practice factor have been incorporated into the tables. These tables will support ephemeral erosion prediction when using RUSLE.

The chart consists of two tables. The table at the top of the chart is to be used only as a guide for conservation treatment of ephemeral gullies and will not take the place of onsite field observations. The bottom table is to be used for reporting purposes only.

The USLE ephemeral prediction tables were originally generated by the Oklahoma Ephemeral Gully Estimator Model (OEGEM) developed by Bill Porter and Bob Morton from the Claremore Watershed Planning Staff. The OEGEM is based on concepts found in two other models previously developed. The Ephemeral Gully Erosion Estimator Model (D. A. Watson, J. M. Laflen, and T. G. Franti, Estimating Ephemeral Gully Erosion, 1987) was used to estimate the average annual concentrated flow erosion for representative gullies. Procedures identified in the Erosion Land Treatment - 4-II Model (M. Bircket, R. Reznik, J. M. Brandon, SNTC Economist Workshop, Montgomery, Alabama, 1985) were used to estimate ephemeral gully erosion on a field basis. The values determined by these procedures were adjusted to correspond to the Oklahoma field conditions.

The data base used as the source for these tables consisted of 23 Oklahoma field locations containing 261 ephemeral gullies. These fields were observed in 1986 and 1987 following a very wet fall which was beneficial for defining the depreciated area within a field that is subject to ephemeral erosion. The magnitude of erosion resulting from this wet period was not used as the basis for the average annual erosion rates reflected in the tables. Therefore, these values are not biased by the fact that data was collected following a high erosion period. The field locations were specifically selected to be representative of a range of hydrologic soil groups, slopes, and rainfall-runoff conditions.

The ephemeral erosion rates for K = .37 soils are higher than for the K = .43 and K = .49 soils. The K = .37 soils, generally have surface textures of silt loam or loam and subsoil textures of silty clay loam, clay loam, loam, or silt loam. These soil textures have less resistance to ephemeral erosion. The K = .43 and K = .49 soils contain surface textures and subsoil textures with larger amounts of clay. Therefore, they are more cohesive and more resistance to ephemeral erosion.

The new charts were developed by incorporating RUSLE values where USLE values were used in the original model. Since RUSLE created new R values, interpolation between charts had to be done to determine ephemeral erosion rates for R values which did not exist prior to RUSLE.

Ephemeral gully erosion will be assumed to be zero on fields with adequate terrace systems.

NRCS, OKLAHOMA
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Exception:

Treatment for ephemeral erosion is not required when the length of the field, as measured from the top of the slope to the bottom, does not exceed the required terrace or diversion interval.

Example: Field investigation indicates ephemeral gully erosion is present.

Calculations: R = 260
S = 2.0%
K = 0.30
Actual CP = 0.18
Slope length is 200 feet (Top of field to bottom)

Terrace VI = 0.5 (2.0) + 3.5 = 4.5
4.5/2.0 X 100 = 225 feet terrace spacing

200' < 225' - Therefore, treatment for ephemeral gully is <u>not</u> required.

While the procedures and data presented are the best that are currently available for use in Oklahoma, it is realized that the data base was selected to represent averages. When a field situation indicates ephemeral erosion is occurring at rates in excess of or less than those shown on the charts, the following alternative procedure is proposed to be used. This alternative is to carefully evaluate the area and volume of ephemeral erosion within the field at the end of the erosion cycle. Using this alternative, treatment for control of ephemeral erosion will be required if the following product is greater than 70:

(% of field affected by ephemeral erosion) *X* 100 *X* (average annual ephemeral erosion rate tons/ac/yr from the area affected by ephemeral erosion)